

THE TYPES AND STATUS OF *PAPILIO TASSO* STAUDINGER

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ABSTRACT. Two syntypes, sole representatives of *Papilio tasso*, are critically examined for the first time and a lectotype male designated. The previously unexamined male genitalia are described and illustrated as well as the hitherto unillustrated syntype female. Lectotype wing characters and distinctive symmetrical valval harpes strongly suggest *tasso* is a valid species of the *torquatus* group of *Heracles*. However, it should be investigated whether the lectotype represents a hybrid of common *H. torquatus* Cramer and nearly extinct *H. himeros* Hoppfer, and the syntype female an aberration or hybrid of the *H. polybius* Swainson complex.

Additional key words: taxonomy, Papilionidae, *Heracles tasso*.

Papilio tasso has been one of the most enigmatic of swallowtail butterflies. The only known specimens, the male and female syntypes at the Zoologisches Museum der Humboldt Universität zu Berlin (ZMH), have remained unexamined by 20th century students of Papilionidae. Workers have either (a) retained *tasso* as a species based on Staudinger's (1884 [1888]) description and figure of the male (Rothschild & Jordan 1906, Jordan 1907, Munroe 1961, D'Almeida 1965, Hancock 1983), (b) questioned its status (K. S. Brown Jr. pers. comm.), or (c) suggested that the species might not exist (D'Abbrera 1981). The *tasso* female has not previously been illustrated.

All workers have associated *tasso* with the *torquatus* group of *Heracles* Hübner, including with it the following taxa (distributions from D'Abbrera 1981, American Museum of Natural History [AMNH] and D. Matusik [DMC] collections): *H. himeros* (Hoppfer) (SE Brazil), *H. torquatus* (Cramer) (many subspecies from central Mexico to S-central South America), *H. garleppi* (Staudinger) (subspecies in W Amazon basin, Bolivia, and "Guianian region"), *H. lamarchei* (Staudinger) (Bolivia and SE Brazil, N Argentina), *H. hectorides* (Esper) (SE Brazil W to Bolivia and S to N Argentina). Most of these species (except perhaps *H. hectorides*) are considered rare, and are poorly represented in collections.

The sister group of the above taxa, the *Heracles anchisiades* group, was recently reviewed (Johnson & Rozycki 1986). As part of an effort to clarify the status of terminal taxa in the *torquatus* group, we examined the *Papilio tasso* syntypes.

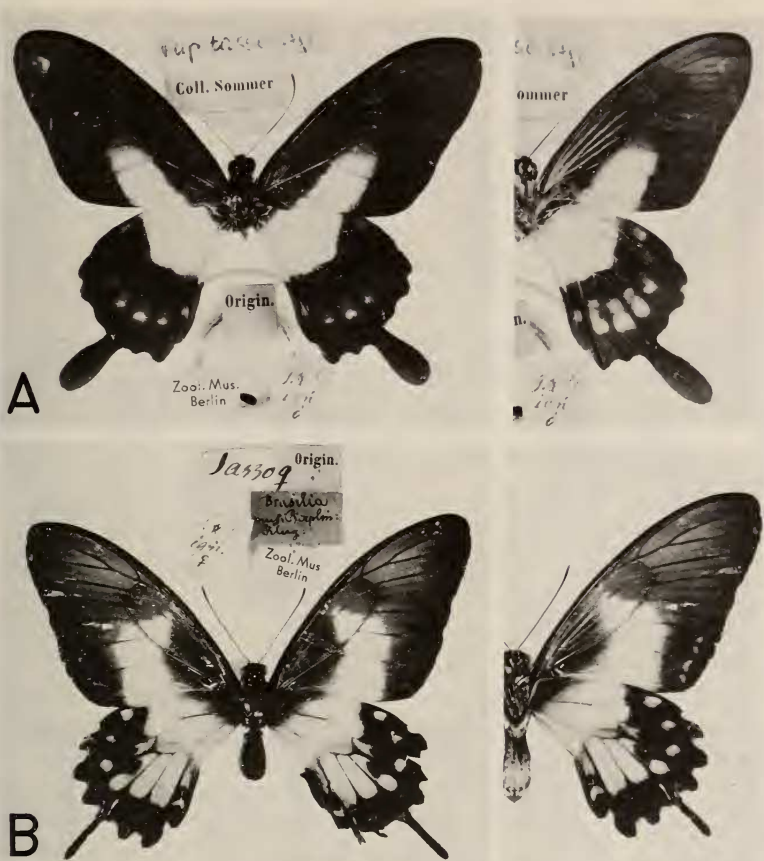


FIG. 1. *Papilio tasso*. A, Lectotype male; B, Syntype female. Upper surfaces at left, under surfaces at right.

Heraclides tasso (Staudinger)
(Figs. 1-2)

Papilio tasso Staudinger 1884 [1888]:19.

Types. Lectotype male (Fig. 1A) (ZMH) labelled "Origin", "Pap. tasso Stgr.", "Coll. Sommer", "Zool. Mus. Berlin" (no locality label, two undecipherable labels); we attached the label "lectotype designated by K. Johnson and D. Matusik, 1987"; locality by original description—"Brazil". Syntype female (Fig. 1B) (ZMH) labelled "Origin" "tasso female", "Brasilica", "Zool. Mus. Berlin" (two undecipherable labels). We designate the male as lectotype because precedent diagnostic studies utilize male genital characters, and incomplete collection data and other considerations leave doubt about conspecific association of the syntypes.

Characters. The lectotype differs from all other yellow and black members of the *torquatus* group as follows: **Wings.** Both forewing surfaces completely lack yellow coloration distad of median area; both hindwing surfaces lack basal black in yellow bands, broad yellow extending from median area completely to wing base; hindwing devoid of

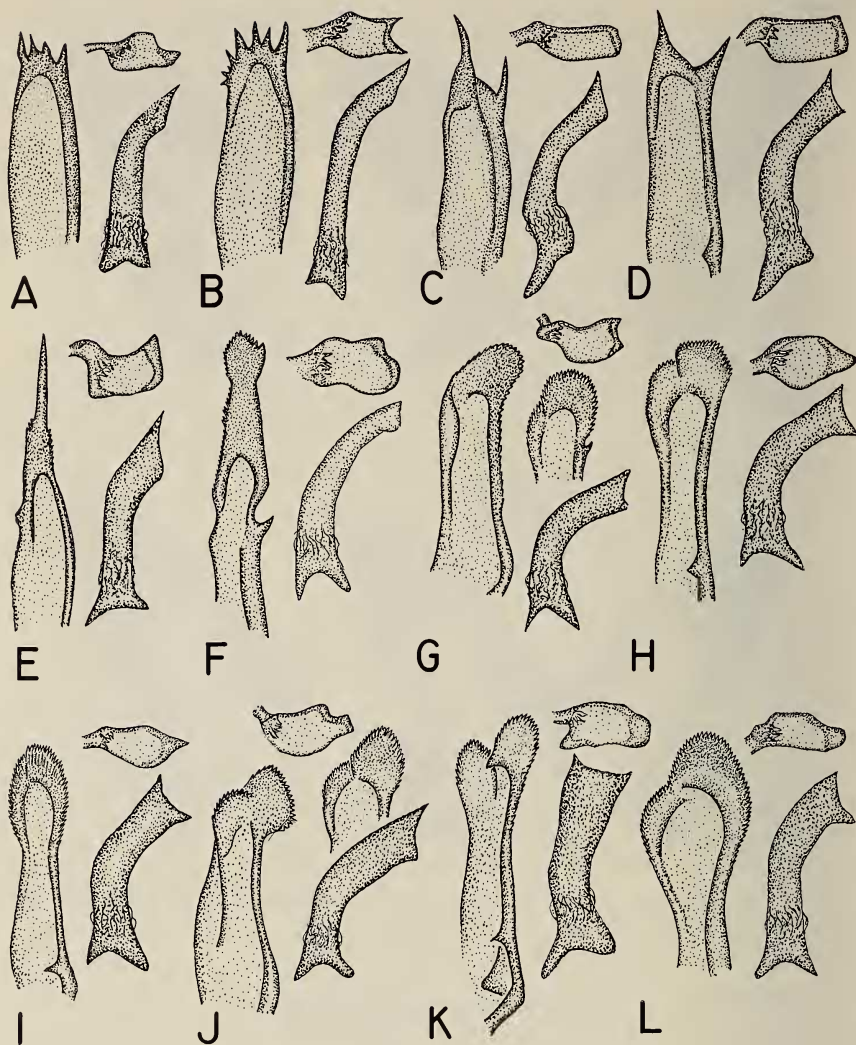


FIG. 2. Male genitalia of the *Heraclides torquatus* group, valvula harpe, inner lateral view, on left; socii, outer lateral view, above right; aedeagus, lateral view, on right. Locality of specimen listed first with number dissected in parentheses if different than 1, additional localities and numbers in brackets thereafter. A, *hectorides*, Santissima-Trinidad, Paraguay (2) [Montevideo, Uruguay]; B, *lamarchei*, topotype, Bueyes, Bolivia [Agua Blanca, Argentina; Ichilio, Bolivia]; C, *garleppi garleppi*, "Bolivia" [Yapacani, E. Bolivia]; D, *g. interruptus* (Staudinger), Sani Beni, Peru [Tingo Maria, Peru; Carabaya, Peru]; E, *himeros*, "Mentor", Brazil [Bahia, Brazil]; F, *tasso*, lectotype; G, *torquatus torquatus*, Buena Vista, Bolivia [Teffe, Brazil], terminus of harpe above aedeagus, *t. polybius*, Matto Grosso, Brazil; H, *t. leptalea* (Rothschild & Jordan), Balzapamba, Ecuador (2); I, *t. orchamus* (Boisduval), Muzo, Colombia [Cauca Valley, Colombia]; J, *tolus tolus* (Godman & Salvin) (species status *sensu* Beutelspacher & Howe 1984), Chiltapec (Oaxaca), Mexico [Cordoba (Vera Cruz), Mexico], terminus of harpe above aedeagus, *tolus mazai* Beutelspacher & Howe,

emphatic postmedian to submarginal markings, these instead limited on under surface to three elongate whitish teardrop-shaped postmedian markings with adjacent smaller spots, and on upper surface to three small yellow spots, cells CU1 to M2; hindwing tails bulbously ovate; forewing length: 43.0 mm. **Genitalia.** Valval harpes symmetrical, each an extremely thin shaft terminating in a large serrate-edged knob; central area of shaft constricted and bearing a large, ventral-pointing spine; aedeagus with markedly constricted terminus. **Abdominal coloration.** Yellow over entire lateral area dorsad to thin black dorsal stripe, with cephalad-pointing black incised marking over lateral area of seventh and eighth tergites.

Status of *H. tasso* Based on Lectotype Male

Characters of the male valval harpe distinguish various papilionid taxa (Munroe 1961, Hancock 1983). We also showed useful differences in some aedeagii (Johnson et al. 1985, Johnson & Rozycki 1986). Figure 2 illustrates male genital characters of 14 taxa of the *torquatus* group. With the traditional species-level taxa are included eight taxa viewed by authors as subspecies of *H. torquatus*. Left and right *H. tasso* lectotype valval harpes are symmetrical and, compared with other members of the *torquatus* group, are very distinctive. By traditional taxonomic criteria (Munroe 1961, D'Abrera 1981, Hancock 1983), wing and genitalic characters of the lectotype strongly suggest that *H. tasso* represents a valid species. If so, its long absence from collections may reflect extinction or, as with *H. himeros*, near extinction (Collins & Morris 1985). Some workers, however, suspect that certain distinctive and rare papilionids result from infrequent hybridization (K. S. Brown pers. comm.). If this is true, distributional data and combinations of wing and genitalic characters suggest that *H. tasso* might be a *torquatus-himeros* hybrid. Such hybridization might explain the fuzzy limbal wing pattern and long, terminally knobbed valval harpe of the lectotype. Other characters, however, including the lectotype's symmetrical valvae, central harpe spine, bulbous hindwing tails, and lack of apical yellow do not appear to be easily explained in this manner. In one example of a rare papilionid "species" representing an unusual phenotype of another (Johnson & Matusik 1987), the genitalia of the aberrant specimen were nondistinctive.

Syntype Female of *P. tasso*

Association of the male and female *Papilio tasso* syntypes is problematic. As Staudinger noted, the markings of the female are compelling both as to uniqueness among *torquatus* group females and suggestion

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Guerrero (Guerrero), Mexico; K, *atsukaae* Igarashi, San Salvador, El Salvador; L, *tolmides* Godman & Salvin, Costa Rica. Dissections in AMNH and DMC except *tasso*. The last two are taxa of uncertain status.

of affinity to the male syntype. Workers who suspect *H. tasso* to be a hybrid suggest the syntype female may be an aberration of the non-yellow *H. torquatus polybius* Swainson complex (K. S. Brown pers. comm.). The syntype female resembles the lectotype in the extent and location of the white median to basal bands and in the bold lateral streaks on the under surface of the discal cell. Examination of *torquatus* group females in AMNH, DMC, British Museum (Natural History) (BMNH), Carnegie Museum of Natural History, Field Museum of Natural History, and Allyn Museum of Entomology indicates the syntype female is distinctive. Not only does it differ from congeners in the wing characters resembling the lectotype, but no other female specimen has extensive pink-orange on the hindwing or an abdomen almost completely white (congeners have a variably wide white lateral stripe). This extent of abdominal white is compatible with the extensive lateral yellow distinctive of the *tasso* lectotype and, to a lesser extent, males of *H. himeros*. Among *torquatus* group females, widening of the white forewing bands sometimes occurs in *H. torquatus* and *H. hectorides*. Usually, however, this widening does not include the discal cell, which is profusely invaded by white in the *tasso* syntype female. We know of no other specimen with basal to median white on the hindwing. A specimen of uncertain identification in BMNH labelled "Rio de Janeiro, Brazil" is similar to the *tasso* syntype female in wing and abdominal color characters except that it lacks basal to median white on both hindwing surfaces. We have not been able to ascertain if this is the same BMNH female cited by Rothschild & Jordan (1906:622) as bearing Gray's label "*P. polybius* 'variation a'" and appearing to them as synonymous with *H. tasso*. Original labels from Gray's curations apparently have not always survived. However, since the above female was segregated, it may be the same specimen. (We affixed a label to it, "*H. tasso*? . . .", referring to this paper.)

At present, study of the *H. tasso* female has limited value since females of the *torquatus* group are so rare in collections that the samples noted above would allow only comparison with *H. torquatus* and *H. hectorides*.

CONCLUSIONS

Traditional taxonomic criteria strongly suggest the lectotype of *H. tasso* represents a valid species. If so, it is possibly extinct or perhaps has not been collected since its original description. A number of "rare" papilionid taxa are known from only a few specimens (D'Abbrera 1981, Johnson et al. 1985, 1986a, 1986b, 1986c); others have been collected only in disparate time periods (Collins & Morris 1985, Johnson et al.

1985, 1986b). Field and biological work must determine if extant natural populations exhibit the phenotypes of the *Papilio tasso* syntypes and whether their unique characters are attributable to hybridization or aberration.

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